**FUNDAMENTALS OF INDUSTRIAL HYGIENE, 6TH ED.**

**HOMEWORK #5**

**INDIVIDUAL MEASUREMENT OF SOUND – SPREADSHEET DEVELOPMENT**

**Name: KEY *63 pts. possible***

**EXERCISES:** Perform the calculations identified below. Show your work neatly and clearly in a manner similar to the examples provided above (i.e., write the formula, define each variable in the formula, show steps of your calculations).

**Part I: Sound Power Levels**

Using your spreadsheet, find the corresponding sound power levels (in *dB*) given the following sound powers (round to the nearest whole number): *(5 points)*

0.09632 *W* = **110 *dB***

0.9632 *W* = **120 *dB***

9.632 *W* = **130 *dB***

96.32 *W* = **140 *dB***

963.2 *W* = **150 *dB***

Notice that each of the values given represents a ten-fold increase in power output from the previous value.

What is the relationship in sound power (*W*) and sound power levels (in *dB*) based on your calculations? *(1 point)*

*When the sound power is increased by a factor of 10, the sound power level increases by* ***10***  *dB.*

**Part II: Sound Pressure Levels**

Using your spreadsheet, find the corresponding sound power levels (in *dB*) given the following sound powers: *(5 points)*

467.34 *μPa* = **27 *dB***

4673.4 *μPa* = **47 *dB***

46734 *μPa* = **67 *dB***

467340 *μPa* = **87 *dB***

4673400 *μPa* = **107 *dB***

Notice that each of the values given represents a ten-fold increase in sound pressure from the previous value.

What is the relationship in sound pressure (*μPa*) and sound pressure levels (in *dB*) based on your calculations? *(1 point)*

*When the sound pressure is increased by a factor of 10, the sound pressure level increases by*  ***20***  *dB.*

**Part III: Variable Determination**

Identify five pieces of equipment common to an industrial facility or construction site (e.g., vehicles, tools, machines, fans, pumps) and perform an on-line search for typical decibel level outputs for each.

Using your spreadsheet, determine the sound power (*W*) and the sound pressure *(μPa*) for each (round to two decimal places). *(15 points)*

**equipment *dB* sound power sound pressure**

***(W)* *(μPa)***

*(scientific notation)*  *(scientific notation)*

***(do not count)***

***(do not count)***

***(do not count)***

***(do not count)***

***(do not count)***

Note: Print a copy of the Sound Power Level and Sound Pressure Level spreadsheet formatted to fit on one side of a standard 8.5 X 11 page.

Attach the printout to the back of this page for submittal.

**Part IV: Noise Level Contours**

This exercise will be submitted electronically.

Before saving your spreadsheet, please do the following:

 make sure the “zoom” for the Sound Calculations spreadsheet is set to 100%;

 make sure the “zoom” for the Sound Contours spreadsheet is set to 95%;

 place the cursor in cell A:1 of each tab of the spreadsheet; and

 size the window of the Sound Contours tab of the spreadsheet so the entire work is visible.

Save your spreadsheet and then re-name it, using: First Initial, Last Name, HW5, SHM471.xlsx

(ex. BSmithHW5SHM471.xlsx) Note: no commas.

Attach the spreadsheet to an email addressed to your instructor: [Sullivanall@cwu.edu](mailto:Sullivanall@cwu.edu)

 in the Subject line, type: SHM 471 Homework #5

 include a salutation (e.g., Dr. Sullivan or Doc)

 include a brief note regarding the purpose of the email

(e.g., Attached, please find my Homework #5 exercise that is due on XXXXday.)

 include a complementary (e.g., Thanks, V/R (virtual regards when used in an email))

 include your name (e.g., Yosemite Delano, Y. Delano)

 make sure you attached the spreadsheet

 click on the “Send” button



